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ABSTRACT

Because it provides students with a strategy for the transfer of attributes from a familiar to an unfamiliar topic, the use of analogies can improve memory, increase specific knowledge, and encourage more critical evaluation of information. Analogies have been used to help students understand health and science materials, improve their vocabulary, and develop concepts in the content areas. To teach students to reason analytically, teachers can show them analogies of many types and help them discover and analyze the different kinds of relationships that can be expressed through the use of analogies. Once students have mastered the technique, teachers can ask them to write analogies relating to a passage they have read or have them discuss the relevance of a given analogy. Teachers can use discussions of differences between analogies to show that interpretation of a written text is subject to the reader's background of knowledge. Analogies can be used for literature as well. Through the strategy AEIOU and Sometimes Y (Analyze relationships, Explain, Instruct, Organize, Use, and sometimes You) instructors can provide structure and encouragement to students in using analogies and developing critical reading and thinking skills. (Appended are several instructional sheets that can be used to guide students through the instructional use of analogies.) (HOD)

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GUIDE STUDENTS TO READ CRITICALLY THROUGH THE INSTRUCTIONAL USE OF ANALOGIES

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GUIDE_STUDENTS_TO_READ_CRITICALLY_THROUGH_THE_INSTRUCTIONAL_USE_OF_ANALOGIES

In 1978, leaders of several major educational organizations met to develop a statement on the essentials of education. This statement has since been adopted by 29 leading educational associations. The developers of this position paper agreed that the ability to reason well across content areas should be an overarching goal for all students. Included in this statement was the expectation that students be taught to use language, to think and communicate effectively. Comprehension of written text, reading, was considered to be a necessity for academic as well as lifetime success.

Comprehension of written text occurs on several interdependent, but different levels (Smith, 1963, Clymer, 1968, Ruddell, 1978, Rosenshine, 1980). According to Edgar Dale (1972), reading can be done on at least three different levels of thinking which he labels duplication, implication, and application. To do more than duplicate the author's message, critical reading skills are required. It should be noted that many students develop skills for reading at a factual level, but do not develop higher level reading skills needed for critical evaluation of written materials.

There are many reasons that students don't learn the skills needed for critical reading. Raymond Nickerson (1981) wrote that

students need to be able to think critically before they can read critically. He found that people limit their ability to think critically because they often confuse logical validity with empirical truth. They also tend to seek confirming, rather than disconfirming, evidence to support their beliefs. In other words, they seek substantiation for their beliefs and ignore conflicting evidence. Further, they inadequately distinguish what they remember about specific events and what they infer from their more general knowledge. To add to the problem, they overestimate what they know about matters of which they have limited knowledge.

Arthur Whimbey and Jack Lochhead (1981) indicated that reasoning processes break down because people fail to observe and use relevant facts, they fail to articulate relationships, and are inconsistent in the performance of mental tasks. Failure to approach a problem in a systematic manner leads to leaps in logic which result in faulty conclusions. Error sources are usually interrelated, but one type may be more frequent than the others depending on the person and the problem.

The lack of strategies readers use in acquiring new information may also contribute to the problem. Isolated bits of knowledge that appear unrelated to familiar topics in the reader's background are difficult to remember. Only assimilated knowledge is well maintained in memory. Memorizing information may not constitute thinking, but the manipulation of memories is necessary to thinking.

A person may have learned to think critically and still experience difficulty in evaluating written materials. Readers

may recognize the skills needed for critical reading and lack the ability to apply them. Vye and Bransford (1981) noted the difference between ability to recognize a solution to a problem and the ability to generate a solution. One of the causes for this disparity, suggested these authors, could be found in teachers' goals. Generally, teachers emphasize content rather than process in the learning situation. Students are taught what to think, but not how to think. Klein (1979) explained that some reasoning skills are the result of growth, but that many critical reasoning skills simply do not accrue through maturation. Instruction is required.

Disabled readers often have an additional disadvantage--that of low teacher expectation. Students are not expected to read critically because their ability to read and respond factually is inadequate. This cyclical process leads to limited acquisition of information, poor development of evaluation skills, and incomplete understanding of material.

How, then, do we help students overcome the obstacles which prevent them from critical evaluation of written materials? Nickerson (1981) suggested that applying analogies to domain specific knowledge could be useful to the reader. Providing students with a strategy that allows transfer of attributes from a familiar topic to an unfamiliar one could be instrumental in improving memory, increasing specific knowledge, and encouraging more critical evaluation of information. While there is pressure to "do" analogies, there is infrequent instruction in the solution processes. When systematic instruction is provided, it is in test taking techniques taught to students preparing for the

Scholastic Aptitude Test (SAT) or PSAT. I believe that poor readers, as well as better readers, should be taught to think critically and helped to read critically through the instructional use of analogies.

Research Background

Analogies have been used frequently in educational research to study the relationship between scores on analogies tests and later achievement. Both achievement and intelligence tests have included analogies, e.g. Graduate Record Examination , Cognitive Abilities Test , Woodcock Reading Mastery Test . The SAT scores have been used to determine acceptance to many colleges because the scores correlate positively with grades obtained at the end of the freshman year of college. Scores on the Miller Analogies Test have been used to determine acceptance into some graduate school programs based on the positive correlations with success at that level.

The research literature includes studies done to determine the relationship between cognitive development and ability to solve analogies. From the results of studies by Goldstein (1962), Levinson and Carpenter (1974), and Sternberg and Nigro (1980), it can be assumed that there are developmental patterns; older subjects were able to perform better that younger subjects. Orlando (1971) and Gallagher and Wright (1977, 1979) conducted studies on the development of analogical reasoning in elementary

and secondary students. They found that ability in completion of analogy problems increased with age, but the difference between age groups was found in the solution of abstract analogies, not of concrete analogies. This difference was insignificant after students reached adolescence.

Most often analogies have been used to test reasoning, not to teach the techniques required in their solution. According to Singer (1983), there is a paucity of research in understanding the acquisition of information. However, from his review of the limited existing research, he suggested that teaching devices such as analogies might be used to bridge prior and new knowledge. Hayes and Tierney (1982) reviewed the research on the use of analogies to enhance learning and reported that few studies could be found in the experimental literature. They did report the positive results of Ausubel and Fitzgerald (1961), Mayer (1975), and Schustack and Anderson (1979).

Ausubel and Fitzgerald (1961) concluded that superior learning occurred when readers had an analogous passage on a familiar topic presented prior to a passage on an unfamiliar topic. Mayer (1975) related that analogies appeared to require relevant knowledge structures which facilitated learning. Schustack and Anderson (1979) reported that the use of analogies promoted elaborate encoding of information which improved memory if there was a close relationship between past knowledge and new material.

The conclusions reached by the above researchers encouraged Hayes to conduct further research. Hayes (1979) found in his study reported by Hayes and Tierney (1982) that analogies

embedded in text or an analogous advance presentation helped students extend their knowledge structures. This allowed them to acquire and comprehend new information. The influence of the use of analogies was not consistent across treatment groups. The best results of instructional use of analogies resulted when students had some familiarity with the subject.

Practical Application

The ability to solve analogies is basic to all areas of the curriculum. But, analogies, like proportion, may be difficult for many students to understand. To understand an analogy, the reader must be able to establish a relationship between the given components. There are three steps needed in solving an analogy. The reader must understand the first three parts of the analogy, determine the relationship between the first pair, and then introduce the relationship to the second pair. In addition, in analogical reasoning, the rules change from case to case. Rule changing is a fundamental property of analogy solution. Another thing to remember, for ourselves and our students, is that the relationship may cross domains. This does not change the relationship, but may make it more difficult to determine when vocabulary and knowledge in the content area are limited.

This relationship of words can be presented in a variety of ways: A is to B as C is to D, often shown A:B::C:D, (Aristotelian), A is to B as B is to C, A:B::B:C, (Pythagorean), A is to B as C is to B, A:B::C:B, or A is to C as B is to D,

A:C::B:D. The most frequently used types are the first two. Exercises using analogies usually have either one or two parts to be completed. For example: A:B::C:____, or A:B::____:____.

Instructional Strategies

Analogies have been used to teach a variety of skills. McIntyre (1977) used analogies to help students understand health and science materials. She used motorcycle parts to aid in the understanding of body parts. Students categorized the information into two lists: motorcycle parts and body parts. They then matched words from the lists. From these matched pairs, analogies were developed.

Example:

Wheels are to Motorcycle as Feet are to Body

Horn is to Vocal Chords as Frame is to Skeleton

Dupuis and Snyder (1983) used analogies as part of a program to teach vocabulary and develop concepts in the content areas. They did not directly provide instruction in the solution of analogies; they gave practice exercises using analogies. First, a categorization exercise was used to show students how words could go together. Given a list of words, students grouped those that were related. Then students discriminated between words which belonged to a higher level concept and those which did not. Finally, students were given a multiple choice format from which to select the correct solution to analogies.

Whimbey and Lochhead (1981) chose analogies to teach reasoning skills. They broke the process down into several small steps.

Step One: Develop an analogy for the students.

Example: Fuel Pump is to Car as Heart is to Human

Step Two: Provide relationship sentences. Have students select statement that best describes the relationship.

Example:

A _____is a _____.

A _____pumps gas in a _____.

A _____moves fluid in a _____.

Step Three: Write relationship sentences.

Example: A fuel pump moves fluid in a car. A heart moves fluid in a human.

Step Four: Complete an analogy and explain the relationship.

Example: A Carburetor is to Car as:

Arms to Person Hood to Bonnet

Lungs to Person Blood to Heart

Step Five: Practice solving analogies by varying the format.

Example: Find A and D or find B and D.

For each analogy developed, a relationship sentence was composed. The relationship sentence was used to demonstrate that the solution must fit the sentence or the analogy would not be correct. Also, in critical reading it is necessary to find and state the problem. Whimbey and Lochhead insist that verbalization be used in the learning process to check that no steps are missed. They further recommend that students work in

pairs or groups so that the process can be monitored while being developed. This permits recognition of error patterns and prevents their repetition.

I recommend the use of a similar operation, the "AEIOU and Sometimes Y" method. First, teach students to reason analytically by showing them analogies of many types. Help them to discover and analyze the different kinds of relationships that can be expressed through the use of analogies. Do not provide a word list for immediate solution of analogies. Let students practice discovering analogous relationships, then let them find the word or words that will complete the analogy. Materials can be purchased or you can create your own from knowledge of your students' backgrounds. If you have access to a microcomputer and appropriate software, let students practice in groups.

Once students have mastered the technique, read a passage to them and provide an analogy that relates to the passage. Have them explain the relationship. Let students write a different analogy for the same passage and discuss their reasons for choosing the relationship.

Next, let them read a passage on their own. Provide an analogy and discuss the relevance. If vocabulary will be a problem, instruct through the use of a list of words for which analogies can be written. Finally, give them a passage to read and have them develop an analogy. This will help them to organize their thinking about their previous knowledge. Differences in analogies should be discussed to show that interpretation of written text is subject to readers' backgrounds of knowledge. Analogies can be used for literature as well as

science and social studies.

AEIOU and Sometimes Y=Analyze relationships, Explain, Instruct, Organize, Use, and sometimes You---you may have to provide structure and encouragement. Since the long term goal is to teach students to read critically when reading alone, the teacher must move away from the role of instructor. Eventually each student is expected to develop analogies without the help of the teacher. Students need to use their own unique background of information to create analogies that are meaningful for them.

More research is needed to understand the process of acquiring information so that we may provide better ways to teach students to think critically. There is justification for teaching the skills used in solving analogies. Further, this instruction should be as systematic as possible for all of our students. Often, the students who need such instruction most are the ones who don't get it. Instruction using analogies to bridge the gap between new and known can help all students and should be provided so that they may all become more critical consumers of information.

Addison reminds us analogically, "Reading is to the mind as exercise is to the body."

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ANALOGIES

What are they? Analogies are pairs of words that are alike in some way.

What do they do? Analogies let us explain ideas and extend relationships.

Why do we need to solve them? They can help us organize our thinking and understand new information.

When do we use them? We can use them when thinking or reading about something new or different. The use of analogical thinking helps us to understand the ideas presented, evaluate and extend the information, and create new ideas.

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Guidelines:

1. Read the directions carefully before beginning the work.
2. Always identify the relationship between the first pair of words before extending the relationship to the second pair.
3. Check to see that you didn't invert the relationship in the second pair. This is sometimes a problem because the association appears to be right.

.....

Format:

There are several ways that analogies can be presented. One way is to present one pair and a third word, with the last word to be completed by you. (Example: hot is to cold as up is to _____, or hot:cold::up: _____.) Another way is to present one pair and a third word, using one word in the pair as the first word in the second pair. (Example: 1 is to 2 as 2 is to ____, or 1:2::2:___.) Still another way is to present one pair of words and have you select from pairs. (Example: hot is to cold as: snow is to rain, up is to down, red is to blue.)

Name_____ Date_____

Analogies

Analogies can be made using words that show number or tense. Be sure that you know which way the first pair of words is going, past to present or future to present, or singular to plural, etc.

Example: do:did::have:had hand:hands::eye:eyes

Analogies can be made using words that sound alike but are spelled differently (Homonyms).

Example: do:dew::meet:meat

.....

DIRECTIONS: Study the first pair of words.
Put N on the line in front of the analogy if the relationship is number.
Put T on the line in front of the analogy if the relationship is tense.
Put H on the line in front of the analogy if they are homonyns.
Then find a word pair in the list to complete the analogy.

---

1. _____ be:bee::_____
2. _____ run:ran::_____
3. _____ scent:cent::_____
4. _____ saw:see::_____
5. _____ mouse:mice::_____
6. _____ million:millions::_____
7. _____ in:inn::_____
8. _____ children:child::_____
9. _____ foot:feet::_____
10. _____ eating:ate::_____

Word Pairs

Choose one of these pairs to complete each analogy:

eye:I sink:sank louse:lice ate:eight laughed:laugh

sport:sports goose:geese swimming:swam you:ewe hotel:motel

went:go men:man tooth:teeth oxen:ox fantastic:great

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Name_____ Date_____

Analogies

Analogies can be made by using words that are opposite in meaning(Antonyms).

Example: near:far::sick:well

Analogies can be made by using words that are the same or similar(Synonyms).

Example: glad:happy::evening:night

.....

DIRECTIONS: Study the first pair of words.
Put A on the line in front of the analogy if they are antonyms.
Put S on the line in front of the analogy if they are synonyms.
Then find a word in the list to complete the second pair.

---

1. _____ love:hate::adore:_____
2. _____ question:answer::huge:_____
3. _____ author:writer::window glass:_____
4. _____ hello:good-by::hall:_____
5. _____ first:last::locomotive:_____
6. _____ actor:player::material:_____
7. _____ wallet:billfold::coat:_____
8. _____ gain:loss::success:_____
9. _____ begin:start::end:_____
10. _____ rug:carpet::lamp:_____

Word List

Use one of these words to complete each analogy:

caboose	cloth	dress	despise	pane	failure	farewell
lantern	worship	finish	gigantic	tiny	jacket	say

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Name_____ Date_____

Analogies

Analogies can be made using words that describe a part of an object and the entire thing, or two parts that make up an object. Sometimes the object is given first and then a part of it.

Example: bicycle:tire:house:room tail:dog::page:book
petal:stem::trunk:limb

.....

DIRECTIONS: Study each pair of words.
Write W/P on the line in front of the analogy if it is whole/part.
Write P/W on the line in front of the analogy if it is part/whole.
Write P/P on the line in front of the analogy if it is part/part.
Then choose a word from the list to complete the analogy.

---

1. _____face:mouth::car:_____
2. _____homestretch:race::flower:_____
3. _____brush:bristle::desk:_____
4. _____bleach:detergent::cups:_____
5. _____speaker:radio::dial:_____
6. _____room:ceiling::mountain:_____
7. _____key:typewriter::page:_____
8. _____green:blue::niacin:_____
9. _____oxygen:hydrogen::limestone:_____
10. _____tine:fork::leaf:_____

Word List

Use one of these words to complete each analogy:

clock	motor	tree	football	garden	hills
plates	thiamin	garden	coach	sandstone	peak
drawer	artist	book	bud	floor	branch

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Name_____ Date_____

Another way to form analogies is to classify them in some way. They may be examples that are co-ordinated.

Example: carrot:beet::peach:apple

They may represent a subordinated relationship.

Example: frog:amphibian::dog:mammal

Or, they may represent a superordinated relationship.

Example: bird:wren::flower:rose

.....

Directions: Study the first pair of words.
Put C on the line in front of the analogy if they are co-ordinated.
Put S on the line in front of the analogy if they are subordinated.
Put SP on the line in front of the analogy if they are superordinated.
Find a word from the word list to complete the second pair.

---

1. _____dog:collie::fruit:_____
2. _____captain:general::worker:_____
3. _____root beer:soda::beef:_____
4. _____golf:tennis::red:_____
5. _____calculus:trigonometry::October:_____
6. _____oak:maple::yew:_____
7. _____candy:fudge::furniture: _____
8. _____biology:science::football:_____
9. _____tree:elm::building:_____
10. _____Ford:Chevy::vanilla:_____

Word List

Use one of these words to complete each analogy:

boss	major	chocolate	word	sports	green	never
apple	July	house	pine	chair	meat	swimmer

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More Analogies

More analogies can be made using sequence. This means that words are compared in a certain order. Be careful that you determine the correct order.

Example: October:November::Tuesday:Wednesday

Analogies can also be made using characteristics. This may take any of several forms.

Example: dog:bark::cat:meow or stove:cook::ruler:measure

or attorney:law::teacher:education or poet:poem::author:book

.....

DIRECTIONS: Study the first pair of words.
Put S on the line before the analogy if the relationship is sequence.
Put C on the line before the analogy if the relationship is one showing a characteristic.

---

1. _____ glass:smooth::sandpaper:_____
2. _____ afternoon:evening::spring:_____
3. _____ two:three::four:_____
4. _____ hammer:pound::brush:_____
5. _____ senior:junior::second:_____
6. _____ cotton:fluffy::sugar:_____
7. _____ wet:water::sticky:_____
8. _____ emerald:green::sky:_____
9. _____ athlete:burly::knife:_____
10. _____ O:P::6:_____

WORD LIST

summer	sour	rain	red	sharp	first	blue
5	glue	rough	paint	7	five	sweet

Check your work!

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Name_____ Date_____

AND STILL MORE ANALOGIES!

Analogies can be formed using degree of intensity.

Example: shut:slam::tap:pound or slam:shut::pound:tap

Analogies can also be formed using source and product, cause and effect, and need and satisfier.

Example: flax:linen::pig:bacon or sun:heat::hit:bruise

or thirst:water::hunger:food

.....

Directions: Study the first pair of words in each line.
Put < or > to show degree of intensity.
Put S/P on the line in front of the analogy to show source/product.
Put C/E on the line in front of the analogy to show cause/effect.
Put N/S on the line in front of the analogy to show need/satisfier.

---

1. _____ upset:frantic::worn:_____
2. _____ sad:cry::happy:_____
3. _____ fat:plump::boil:_____
4. _____ brewery:beer::bakery:_____
5. _____ fear:comfort::recognition:_____
6. _____ sneeze:cold::rash:_____
7. _____ warm:sweltering::flurry:_____
8. _____ sheep:wool::trees:_____
9. _____ ignorance:education::unemployment:_____
10. _____ cruel:unkind::gigantic:_____

Word List

Use one of these words to complete each analogy:

small	big	praise	simmer	swimmer	tattered	sad	laugh
bread	job	lumber	bake	blizzard	measles	good	wheat

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Name_____ Date_____

How Many More Analogies Are There?

The last grouping of analogous relationships can best be described as Description/Attribute. These are based on male/female relationship, virtue/failing, symbol/institution, object/association, and physical description.

Example: doe:buck::ewe:ram or car:road::train:tracks
or midget:short::sandpaper:rough

.....

DIRECTIONS: Study the first pair of words.
Choose a word from the word list to complete each analogy.

---

1. scales:justice::flag:_____
2. waiter:waitress::janitor:_____
3. airplane:sky::ship:_____
4. cotton:soft::water:_____
5. integrity:dishonesty::frugality:_____
6. hot:fire::cold:_____
7. mare:stallion::goose:_____
8. bed:bedroom::couch:_____
9. diligence:sloth::endurance:_____
10. tall:giant::graceful:_____

WORD LIST

beneficial	livingroom	weakness	train	ocean	ballerina
country	gander	cold	wet	house	extravagance
ice	janitress	lasting	pole	small	burning

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ANALOGY HODGE-PODGE

Here is an assorted group of analogies. See how many you can solve. Remember to study the first pair of words carefully. Determine the relationship before looking at the third word. When in doubt, use a dictionary!!!!

.....

1.	gaudy:conservative::harmonious:_____	birds
2.	puppy:dog::kitten:_____	cadet
3.	professor:student::officer:_____	carpenter
4.	hen:rooster::dam:_____	cat
5.	composer:opera::sculptor:_____	discordant
6.	drill:dentist::hammer:_____	Idaho
7.	widower:widor::wizard:_____	love
8.	Midas:greed::Cupid:_____	sire
9.	coal:Pennsylvania::potatoes:_____	statue
10.	house:people::nest:_____	witch

1.	lungs:man::gills:_____	beautiful
2.	April:showers::May_____	bubbly
3.	modest:conceited::smooth:_____	chicken
4.	race:fatigue::fast:_____	fish
5.	drink:drank::see:_____	flowers
6.	milk:cow::egg:_____	hunger
7.	simmer:boil::pretty:_____	lens
8.	airplane:cockpit::camera:_____	rough
9.	knife:sharp::champagne:_____	saw
10.	ceiling:sealing::scent:_____	sent

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Using Analogies to Comprehend Literature

* "The Necklace" by Guy De Maupassant

Vocabulary:

prosperous poise instinctive grieved disconsolate
distinguished distressed vexation anguish irritated

Analogies:

rich:prosperous::poor:needy poise:calm::anger:rage
famous:distinguished::unknown:ordinary grieved:rejoiced::hot:cold

Have students read the selection. Guide their understanding of the story through the use of analogies.

The Minister's Invitation was to Madame Loisel as Invitation to the Ball was to Cinderella.

400 Francs was to M. Loisel as Season Tickets are to Flyers Fans.

Using Analogies to Comprehend World Cultures

** "Africa—Yesterday and Today"

To develop better understanding of the story, provide analogies to describe aspects of another culture.

An oasis was to a caravan as a truck stop is to a ~~truck driver~~ convoy.
Camels were to North Africans as Trucks are to Americans.

*From Adventures in Reading, Harcourt, Brace and World, Inc., 1963
**People and Culture, Noble and Noble, Punlishers, Inc., 1974
(removed due to copyright restrictions)

Using Analogies to Develop Vocabulary

annex	add:annex::subtract:remove
alliance	partnership:alliance::divorce:disunion
continent	country:continent::room:house
crises	crisis:crises::one:many
diplomats	diplomats:diplomacy::teachers:instruction
provinces	country:provinces::necklace:pearls
sultanate	sultan:sultanate::king:monarchy or president:republic

Provide a list of words and ask students to group them according to heading:

Feelings | Physical Land Description | Political Land Description

Word List: peninsula, crises, continent, sultanate, straits, Serbia, landlocked, provinces, Morocco, furor, tension, vulnerable, provoked

Develop analogies using the vocabulary words.

sultanate:Morocco::monarchy:England

Serbia:Balkans::Morocco:North Africa

enraged:provoked::soothed:comforted

* Have students read the assigned selection. Provide analogies to develop better understanding of relationships between nations.

Russia:Britain::Germany:Autria-Hungary

Morocco:Balkans::up:above

Security:19th Century::Tension:20th Century

Russia:Germany::Marple Newtown:Springfield

*From World War I and the Peace Treaties in Man's Story p. 575-576 (removed due to copyright restrictions)

Resources for Developing Analogies

1.	Cognitive Challenge Cards	Academic Therapy Publications 20 Commercial Blvd. Novato, California 94947
2.	1400 Analogy Questions	ARCO 219 Park Avenue New York, N.Y. 10003
3.	How to Prepare for the MAT and How to Prepare for College Entrance Examinations	Barron's Educational Series 113 Crossways Park Drive Woodbury, N.Y. 11797
4.	Reading/Thinking Skills	Continental Press, Inc. Elizabethtown, PA 17022
5.	Recognizing Word Relationships	Dexter & Westbrook, Ltd. Baldwin, N.Y. 11510
6.	Analogy/Thinking Skills 4 books	Educational Teaching Aids 159 West Kinzie Street Chicago, Ill 60610
7.	Reading Skills for Standardized Testing Written Expression: A Specific Skills Program	Hammond Inc. Maplewood, N.J. 07040
8.	Analogies A,B,C, and D Reasoning by Analogy Critical Thinking Book 1 & 2 Amusements in Developing Thinking and Surviving Skills	Midwest Publications P.O. Box 448 Pacific Grove, CA 93950
9.	Building Verbal Power I and II	Random House School Division 400 Hahn Road Westminster, MD 21157
10.	Preparation for the Miller Analogies Test	Regnery
11.	Vocabulary Workshop	William H. Sadlier, Inc. 11 Park Place New York, N.Y. 10007
12.	Reasoning by Analogy: Cognitive Development Intervention Program	Developmental Learning Materials P.O. Box 4000 One DLM Park Allen, Texas 75002
13.	Comprehension Games Drawer 5	Creative Publications 3977 East Bayshore Road P.O. Box 10328 Palo Alto, California 94303

The examples presented in this table are from the Aristotelian paradigm.

Types of
Most Frequently Used Analogies

I Comparison—Semantic

1. Antonym
   Example: Good:Bad::Up:Down

2. Synonym
   Example: Author:Writer::Artist:Painter

3. Word Relationship (Plural, Tense, etc.)
   Example: Foot:Feet::Hand:Hands

II Comparison—Non-Semantic

1. Homonym
   Example: Bow:Bough::Do:Dew

2. Letter Relationship
   Example: Pat:Tap::Net:Ten

3. Word Relationship
   Example: Me:Card::Bar:Future

III Portion Of

1. Part/Whole
   Example: Toe:Foot::Finger:Hand

2. Whole/Part
   Example: Year:Month::Week:Day

3. Part/Part
   Example: Eye:Ear::Eraser:Lead

IV Class

1. Co-ordination
   Example: Carrot:Beet::Peach:Apple

2. Sub-ordination
   Example: Frog:Amphibian::Dog:Mammal

3. Superordination
   Example: Bird:Wren::Flower:Rose

V Sequence

1. Forward
   Example: January:February::July:August

2. Reverse
   Example: 4th:3rd::Senior:Junior

VI Characteristic

1. Object compared to characteristic
   Example: Dog:Bark::Cat:Meow

2. Instrument compared to its function
   Example: Stove:Cook::Ruler:Measure

3. Person compared to his profession
   Example: Attorney:Law::Teacher:Education

4. Object and material
   Example: Table:Wood::Pan:Metal

5. Creator and creation
   Example: Poet:Poem::Author:Book

6. Object and location
   Example: Animals:Zoo::Fish:Aquarium

7. Association
   Example: Ham:Eggs::Bread:Butter

VII Degree of Intensity

1. Lesser to Greater
   Example: Shut:Slam::Tap:Pound

2. Greater to Lesser
   Example: Gigantic:Big::Scorch:Singe

VIII Source

1. Cause/Effect
   Example: Sun:Heat::Hit:Bruise

2. Need/Satisfier
   Example: Thirst:Water::Hunger:Food

3. Source/Product
   Example: Flax:Linen::Pig:Bacon